

**PRELIMINARY DETERMINATION OF COMPLIANCE
ENGINEERING EVALUATION APPLICATION NO. 3213
LOS ESTEROS CRITICAL ENERGY FACILITY
PLANT #13289**

Background

Calpine Corporation is proposing to develop the first phase of a natural gas-fueled energy generation facility to be located on Alviso-Milpitas Road in San Jose. The proposed Los Esteros Critical Energy Facility (LECEF) project will consist of four natural gas-fired LM6000PC simple cycle turbines with auxiliary equipment

The proposed new LECEF facility will be capable of generating up to 195 megawatts (MW) of electricity. In accordance with BAAQMD Rules and Regulations, Best Available Control Technology will be employed for all regulated pollutants. Offsets will be provided for emission increases of oxides of nitrogen and precursor organic compounds. Emissions of all pollutants will be below 100 tons per year, so the facility will not be a major source and will not be subject to Prevention of Significant Deterioration (PSD) review.

Project Description:

The Los Esteros Critical Energy Facility will consist of the following equipment proposed for installation/operation:

- S-1 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 48.7 MW max, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-1 Oxidation Catalyst, and A-2 Selective Catalytic Reduction System.**
- S-2 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 48.7 MW max, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-3 Oxidation Catalyst, and A-4 Selective Catalytic Reduction System.**
- S-3 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 48.7 MW max, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-5 Oxidation Catalyst, and A-6 Selective Catalytic Reduction System.**
- S-4 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 48.7 MW max, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-7 Oxidation Catalyst, and A-8 Selective Catalytic Reduction System.**

S-5 Fire Pump Engine, Sterling DDFP-06FA, diesel fired, 368 HP, 2.8 MMBtu/hr maximum heat input rating, with NOx controls or equivalent.

S-6 Emergency Generator Engine, Caterpillar G3512 90 LE or equivalent, natural gas-fired, 804 HP (600 kW), 6.44 MMBtu/hr maximum heat input rating.

A small cooling tower for turbine inlet and oil cooling will be installed as part of this project. PM10 emissions from this tower are estimated to be 2.2 lbs./day, which makes this source exempt, from District permit requirements, under regulation 2-2-103, since the emissions are less than 10 lbs./day.

The following projected operating scenario for S-1, S-2, S-3 and S-4 was utilized to estimate maximum annual air pollutant emissions from the new gas turbines.

- 8760 hours of baseload (100% load) operation per year @ 29°F

This scenario was used to simplify the analysis and is considered conservative because it assumes 24-hour operation at a low temperature. Actual operation will include: reduced load, down time and a higher average ambient temperature, all of which will reduce the actual emissions. This will be partially offset by start/stop emissions, which are expected to be only slightly higher and, in some cases lower, than steady state emissions. In any case, the plant emissions will be limited by permit conditions monitored by the Continuous Emission Monitor (CEM).

Emissions Control Strategy:

The proposed project triggers the Best Available Control Technology (BACT) requirement of New Source Review (District Regulation 2, Rule 2, NSR) for emissions of nitrogen oxides (NO_x), carbon monoxide (CO), precursor organic compounds (POCs), sulfur dioxide (SO₂), and particulate matter of less than 10 microns in diameter (PM₁₀). The applicant has proposed the following controls:

Selective Catalytic Reduction with Ammonia Injection for the Control of NO_x

The S-1, S-2, S-3 and S-4 gas turbines will be equipped with water injection to minimize NO_x emissions which will be further reduced through the use of a selective catalytic reduction (SCR) system with ammonia injection. The gas turbine will achieve a BACT-level NO_x emission limit of 5.0 ppmvd @ 15 % O₂ (three hour average) with an annual facility cap of about 75 tons/yr. (equivalent to an annual average of 2.5 ppmvd @ 15 % O₂ and 8760 hours or 5.0 ppmvd and 4380 hours).

Oxidation Catalyst to Minimize CO and POC Emissions

The S-1, S-2, S-3 and S-4 gas turbines trigger BACT for CO and POC emissions. A CO catalyst designed to catalytically oxidize the CO and POC to achieve a BACT-level CO emission limit of 6.0 ppmvd @ 15 % O₂ (one hour average) and an annual facility cap of 95 tons/yr. (equivalent to an annual average of about 5.0 ppmvd @ 15 % O₂). The POC level will be limited to 2.0 ppmvd @ 15 % O₂.

Exclusive Use of Clean-burning Natural gas to Minimize SO₂ and PM₁₀ Emissions

The S-1, S-2, S-3 and S-4 gas turbine will utilize, exclusively, natural gas as a fuel to minimize SO₂ and PM₁₀ emissions. Because the emission rate of SO₂ depends on the sulfur content of the fuel burned and is not dependent upon the burner type or other combustion characteristics; the use of natural gas will result in the lowest possible emission of SO₂. PM₁₀ emissions are minimized through the use of best combustion practices and "clean burning" natural gas.

Emissions Calculations

Hourly Emission Estimates:

NO_x, CO, POC, and ammonia are all limited by BACT and enforceable permit conditions to not exceed certain exhaust concentrations. BACT for SO₂ and PM₁₀ is the exclusive use of clean-burning natural gas. The exhaust concentration, in ppmv, is not specifically limited for SO₂ and PM₁₀, so the hourly emission rate will be taken to be those values provided by natural gas composition and General Electric, respectively.

NO_x emissions. The applicant has proposed a NO_x emission limit of 5.0 ppmv (averaged over three hours), which complies BACT requirements for this gas turbine. The NO_x emissions from the turbine will be limited by permit condition to 5.0 ppmv, dry @ 15% O₂. This concentration is converted to a mass emission factor as follows:

$$(5.0 \text{ ppmvd})(20.95-0)/(20.95 - 15) = 17.61 \text{ ppmv NO}_x, \text{ dry @ 0\% O}_2$$

$$(17.61/1,000,000)(1 \text{ lbmol}/385.3 \text{ dscf})(46.01 \text{ LB NO}_x \text{ (as NO}_2\text{)})/(\text{lbmol})(8600 \text{ dscf/MMBtu}) \\ = 0.0181 \text{ LB NO}_2/\text{MMBtu}$$

The NO₂ mass emission rate based on the maximum firing rate of the turbine is calculated as follows:

$$(0.0181 \text{ LB NO}_x/\text{MMBtu})(472.6 \text{ MMBtu/hr}) = \mathbf{8.55 \text{ LB NO}_2/\text{hr}}$$

CO emissions. The CO emissions from each turbine will be limited by permit condition to 6.0 ppmv, dry @ 15% O₂. The CO mass emission rate based on the maximum firing rate of the turbine is calculated as follows based on 6.0 ppmvd @ 15% O₂:

$$(0.0132 \text{ LB CO/MMBtu})(472.6 \text{ MMBtu/hr}) = \mathbf{6.24 \text{ LB CO/hr}}$$

POC emissions. The POC emission from the turbine will be limited by permit condition to 2.0 ppmv, dry @ 15% O₂. The POC mass emission rate based on the maximum firing rate of the turbine is calculated as follows based on 2.0 ppmvd @ 15% O₂:

$$(0.0025 \text{ LB POC/MMBtu})(472.6 \text{ MMBtu/hr}) = \mathbf{1.18 \text{ LB POC/hr}}$$

Ammonia emissions. The ammonia (NH₃) mass emission rate from the turbine will be limited by permit condition to 10.0 ppmv, dry @ 15% O₂. The NH₃ mass emission rate based on the maximum firing rate of the turbine is calculated as follows based on 10.0 ppmv @ 15% O₂:

$$(0.0133 \text{ LB NH}_3\text{/MMBtu})(472.6 \text{ MMBtu/hr}) = \mathbf{6.32 \text{ LB NH}_3\text{/hr}}$$

SO₂ emissions. The SO₂ emission factor is based upon an expected average natural gas sulfur content that will not exceed 0.25 grains per 100 scf and a higher heating value of 1022 Btu/scf.

The sulfur emission factor is calculated as follows:

$$\begin{aligned} & (0.25 \text{ gr./100scf})(10^6 \text{ Btu/MM Btu})(2 \text{ LB SO}_2\text{/LB S}) / [(7000 \text{ gr./LB})(1022 \text{ Btu/scf})(100 \\ & \text{scf})] \\ & = 0.000699 \text{ SO}_2 \text{ lb. /MM Btu} \end{aligned}$$

The corresponding mass SO₂ emission rate is:

$$(0.000699 \text{ LB SO}_2\text{/MM Btu})(472.6 \text{ MM Btu/hr}) = \mathbf{0.33 \text{ LB/hr}}$$

PM₁₀ emissions. The PM₁₀ emission factor is based upon the manufacturer's guarantees of 2.5 LB/hr for similar installations.

Baseload Hourly Emissions Estimates, LB/hour-turbine

NO₂	POC	PM₁₀	CO	SO₂	NH₃
8.55	1.18	2.5	6.24	0.33	6.32

The start-up/shutdown (non-baseload) emissions data for NO_x, POC and CO were provided by the turbine manufacturer, General Electric, for the United Golden Gate Project. Both the United Golden Gate Project and the Gilroy Energy Center, which use the same make and model gas turbine, used the factors below to estimate start-up and shutdown emissions. A start-up is anticipated to take an average of ten minutes for a simple cycle turbine whereas shutdowns are practically instantaneous. The SCR catalyst will require approximately 30 minutes to reach optimal operating temperature and the oxidation catalyst, about 10 minutes. The emission rates for PM₁₀ and SO₂ have been taken to be

equal to the full load, steady state figure and are lower than United Golden Gate because the steady state figures have been reduced.

General Electric Start-up/Stop Emissions, LB-turbine/hour-start/stop

NO2	POC	PM10	CO	SO2
7.7	0.68	2.5	7.7	0.33

Maximum Daily Emissions, LB/day:

Maximum daily emissions are estimated based on 24 hours of worst-case emission rates. The worst-case daily emission rate is either: a day, which includes a startup/shutdown, with the balance of the daily operations based on 100% load (29 F ambient temperature) or 100% load for 24 hours. The baseload hourly emission estimates are based on allowable BACT concentration emission limits at 100% load. The start/stop hourly emission estimates are based on the emission estimates provided by the turbine vendor for the United Golden Gate Project which used the same make and model gas turbine. In cases there the start/stop emissions are less than the baseline, the baseline number was used for the entire 24 hours.

$$\text{NO}_2 = (7.7 \text{ LB/hr-start/stop})(1 \text{ start}) + (8.55 \text{ LB/hr-baseload})(23 \text{ hr}) = 204.4 \text{ LB/day NO}_2$$

$$\text{or} \quad (8.55 \text{ LB/hr-baseload})(24 \text{ hr}) = 205.2 \text{ LB/day NO}_2$$

$$\text{CO} = (7.7 \text{ LB/hr-start/stop})(1 \text{ start}) + (6.24 \text{ LB/hr-baseload})(23 \text{ hr}) = 151.2 \text{ LB/day CO}$$

$$\text{POC} = (0.68 \text{ LB/hr-start/stop})(1 \text{ start}) + (1.18 \text{ LB/hr-baseload})(23 \text{ hr}) = 27.8 \text{ LB/day POC}$$

$$\text{or} \quad (1.18 \text{ LB/hr-baseload})(24 \text{ hr}) = 28.3 \text{ LB/day POC}$$

$$\text{PM}_{10} = (2.5 \text{ LB/hr-start/stop})(1 \text{ start}) + (2.5 \text{ LB/hr-baseload})(23 \text{ hr}) = 60.0 \text{ LB/day PM}_{10}$$

$$\text{SO}_2 = (0.33 \text{ LB/hr-start/stop})(1 \text{ start}) + (0.33 \text{ LB/hr-baseload})(23 \text{ hr}) = 7.9 \text{ LB/day SO}_2$$

Annual Emissions, tons/year:

The applicant is requesting emission limits based on nominal operation of 24 hours/day, 365 days/year and fuel use equivalent to approximately 8760 hours/year of baseload operation per turbine. The NO₂ emissions from the turbines have been capped at 74.9 tons/yr. and the CO and NH₃ emissions are capped at 95 tons/year. This may necessitate actual emissions being lower than the BACT levels or reduction of the operating time to less than the assumed 8760 hrs/yr. The accumulated emission totals for NO_x and CO will be monitored by the Continuous Emission Monitor (CEM) system. The other pollutants will be monitored by source test and parametric correlation.

NO2 emissions calculation at 2.5 ppmvd average:

$[(4.23 \text{ LB/hr})(8760 \text{ hours/yr.})(2.5 \text{ ppm}/5.0 \text{ ppm})(4 \text{ turbines})](1 \text{ ton}/2000 \text{ LB}) = 74.9 \text{ tons NO}_2 \text{ /yr.}$

POC emissions calculation:

$[(1.18 \text{ LB/hr})(8760 \text{ hours/yr.})(4 \text{ turbines})](1 \text{ ton}/2000 \text{ LB}) = 20.8 \text{ tons POC /yr.}$

PM₁₀ emissions calculation:

$[(2.5 \text{ LB/hr})(8760 \text{ hours/yr.})(4 \text{ turbines})](1 \text{ ton}/2000 \text{ LB}) = 43.8 \text{ tons PM}_{10}\text{/yr.}$

CO emissions calculation at 5.0 ppmvd average:

$[(6.24 \text{ LB/hr})(8760 \text{ hours/yr.})(5.0 \text{ ppm}/6.0 \text{ ppm})(4 \text{ turbines})](1 \text{ ton}/2000 \text{ LB}) = 94.6 \text{ tons CO /yr.}$

SO2 emissions calculation:

$[(0.33 \text{ LB/hr})(8760 \text{ hours/yr.})(4 \text{ turbines})](1 \text{ ton}/2000 \text{ LB}) = 5.8 \text{ tons/yr. SO}_2$

Emergency Generator & Diesel Fire Pump Emissions

	NO2	POC	PM10	CO	SO2
Emergency Generator					
gm/bhp-hr	1.00	0.8	3.5E-4	1.7	N/A
LB/hr (as NO2)	1.77	1.4	0.28	3.0	4.5E-3
tpy (as NO2)	0.09	0.07	1.4E-2	0.15	2.3E-4
Diesel Fire Pump					
gm/bhp-hr	9.13	0.220	0.120	2.16	0.156
LB/hr (as NO2)	7.40	0.174	0.097	1.75	0.127
tpy (as NO2)	0.37	0.009	0.005	0.088	0.006

Emergency Generator emissions are based on 100 hrs/yr. of operation on natural gas with 0.25 gr./100scf of sulfur. Diesel Fire Pump emissions are based on 60 min/day and 100 hr/yr. of operation on fuel with 0.05 % sulfur.

Permitted Maximum Annual Emissions, tons/yr.

	NO2	POC	PM10	CO	SO2	NH3
Turbines	74.9	20.8	43.8	94.6	5.8	110.7
Emergency Generator	0.09	0.07	1.4E-2	0.15	2.3E-4	0
Diesel Fire Pump	0.37	0.009	0.005	0.088	0.006	0
Total	75.4	20.9	43.8	95.0	5.8	110.7

In the above table CO has been capped at 95 tons/yr. to avoid triggering PSD. The CO limit will be monitored by the CEM.

Compliance Determination

This Section summarizes the applicable District Rules and Regulations and describes how the proposed project will comply with those requirements.

A. Regulation 2, Rule 2; New Source Review

The primary requirements of New Source Review that apply to the proposed Los Esteros Critical Energy Facility are Section 2-2-301; “Best Available Control Technology Requirement”, Section 2-2-302; “Offset Requirements, Precursor Organic Compounds and Nitrogen Oxides, NSR”, and Section 2-2-303; “Offset Requirement, PM₁₀ and Sulfur Dioxide, NSR” and Section 2-2-304, “PSD Requirements”.

Best Available Control Technology (BACT) Determinations

The following section includes BACT determinations by pollutant for the permitted sources of the proposed project.

Air Pollution Control Strategies and Equipment

The proposed facility includes sources that trigger the Best Available Control Technology (BACT) requirement of New Source Review (District Regulation 2, Rule 2, NSR) for emissions of nitrogen oxides (NO_x), carbon monoxide (CO), precursor organic compounds (POC), sulfur dioxide (SO₂), and particulate matter of less than 10 microns in diameter (PM₁₀).

The NO_x, CO and oxygen concentrations will be monitored continuously using a continuous emissions monitor (CEM). Therefore, emission concentrations of NO_x and CO will be limited to parts per million (ppm) emissions concentrations in the permit conditions. A pound per million Btu emission factor for POC is proposed to limit the emissions.

BACT for S-1 through S-4, Turbines

Nitrogen Oxides (NO_x)

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT1 (technologically feasible/cost-effective) for NO_x for a simple-cycle gas turbine with a power rating ≤ 50 MW as NO_x emissions < 5.0 ppmvd @ 15% O₂, achieved through the use of Selective Catalytic Reduction (SCR) with ammonia injection in conjunction with combustion modifications and water injection. BACT2 (achieved in practice) is ≤ 5.0 ppmvd @ 15% O₂.

Two relatively new technologies are capable of controlling NO_x emissions from a gas turbine to 2 ppmv or below. These are SCONO_x, manufactured by Goal Line Environmental Technologies, and XONON, manufactured by Catalytica, Inc. The District has reviewed these technologies to determine if they are appropriate for this application.

SCONox is the more established of the two technologies. This system uses a potassium carbonate coated catalyst to remove both NOx and CO, without the use of a reagent such as ammonia. There is one system in commercial operation on a gas turbine of comparable size to this project. Although these technologies have been demonstrated for this source category only SCONox is sufficiently developed to allow the District to approve an application using it.

However, SCONox is installed on a combined-cycle electrical generation system, which typically has outlet temperatures below 400 degrees F. This project will be a simple-cycle system, with outlet temperatures exceeding 850 degrees F. We are not aware of any SCONox applications on turbines with outlet temperatures that high, and Goal Line's Technical Paper describing the system lists acceptable temperature range as 300 to 700 degrees F. This problem may be solved by the use of dilution air to lower the temperature. Based on this information, we believe that SCONox may represent a technologically feasible control option for this project.

XONON, developed by Catalytica, Inc., is another promising new technology for NOx emissions control. This technology uses a flameless catalyst located inside the combustion chamber itself, which allows for the combustion reaction to proceed at a lower temperature than in conventional turbines, thus preventing the formation of NOx.

At the present time, the commercial availability of this technology is extremely limited. To date, we are aware of only one application, a 1.5 MW turbine in Santa Clara, California. There is no information available regarding the operation of such a system on a turbine the size of the one to be installed at this project, which is over 30 times larger. Based on this information, we do not believe that XONON represents a technologically feasible control option for this project.

Water will be injected into the turbine combustor to reduce NOx emissions in the combustor exhaust. Aqueous ammonia is injected into the SCR catalyst to control exiting stack emissions to less than 5.0 ppmvd NOx @ 15% O₂. The ammonia slip will be limited by permit condition to 10.0 ppmv. The applicant is proposing to reduce average NOx emissions below those levels required by current District BACT. Thus, some allowance for ammonia slip is appropriate. Since SCR, controlling NOx emissions to 5.0 ppmv corrected to 15% oxygen, represents a control technology that is technologically feasible, cost-effective, and achieved in practice in a wide variety of applications, it represents BACT for the project. This will comply with BACT.

Carbon Monoxide (CO)

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT (achieved in practice) for CO for a gas turbine with a power rating ≤ 50 MW as CO emissions ≤ 10.0 ppmvd @ 15% O₂, achieved through the use of a catalytic combustor.

The CO emissions from the combustion turbine will be reduced through the use of an oxidation catalyst to less than 6.0 ppmvd CO @ 15% O₂. CO emissions are also

minimized through the use of best combustion practices and "clean burning" natural gas. This will comply with BACT.

The Crockett Cogeneration facility was permitted in 1993 at a CO emission concentration limit of 5.9 ppmvd @ 15% O₂. This established the technologically feasible/cost-effective BACT specification cited above. However, subsequent operation of the facility has shown that this emission concentration cannot be achieved under all operating modes and ambient conditions. Specifically, CO emissions exceed 5.9 ppmvd during minimum load operation under ambient conditions of low temperature and high relative humidity and during peak load operation under ambient conditions of high temperature and moderate to high relative humidity. However, Crockett Cogeneration is confident that the gas turbine will not exceed a CO emission concentration of 10 ppmvd @ 15% O₂ under all loads and ambient conditions with and without duct burner firing.

Crockett has not employed steam injection power augmentation during peak load/high ambient temperature situations since the resulting CO emission concentration would exceed the current emission limit of 5.9 ppmvd CO. Based upon their operating experience, they do not expect to consistently meet 10 ppmvd CO when operating in steam injection power augmentation mode. Therefore, the achieved-in-practice BACT for CO should not apply to the steam injection power augmentation mode.

The few compliance test results available are not sufficient to support the "achieved in practice" determination. Such support would require at least 6 months (and arguably 18 months) of data showing consistent compliance under the full range of operation.

EPA advised that Sacramento Power Authority (SPA) is permitted at 4.0 ppmvd CO @15% O₂, averaged over 1 hour. Per the June 1999 CARB Power Plant Siting Guidance Document, two consecutive years of source testing indicate CO concentrations vary from 0.16 to 0.62 ppmvd CO @15% O₂. In a 9/25/01 telephone conversation with Mr. Grant Chin of CARB, he stated that he had 3 or 4 source tests that show less than 1.5 ppm CO @15% O₂ concentration at the SPA site. In a follow-up telephone conversation with Mr. Chin, he advised the District that the Sacramento Municipal Utility District (SMUD) CEM data for the SPA installation over the past year show compliance with their 3 ppm NO_x limit together with very low CO concentrations (<1 ppm averaged over 24 hours). Without adequate time to analysis and review the CEM data, District staff does not believe there is sufficient justification at this time to use this to set a new lower BACT level.

The District has recently issued power plant permits with a CO emission concentration limit of 6.0 ppmvd @ 15% O₂ during all operating modes except for gas turbine start-up and shutdown. Because the power plants proposed this limit, it was accepted as meeting BACT 1 for CO. However, it is not considered achieved-in-practice BACT since it has not yet been demonstrated in actual operation. The 6.0 ppmvd will be considered BACT 1 "technologically feasible/cost-effective BACT" for CO emissions.

The LECEF has agreed to a CO emission limit of 6 ppmvd @ 15% O₂ that will apply to all gas turbine operating modes except for gas turbine start-up and shutdown. The LECEF

intends to comply with this BACT specification through the use of an oxidation catalyst and combustor design. The applicant's proposed CO level of 6 ppm therefore complies with BACT.

Precursor Organic Compounds (POCs)

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT (achieved in practice) for POC for a gas turbine with a power rating ≤ 50 MW as POC emissions ≤ 2.0 ppmvd @ 15% O₂, achieved through the use of Selective Catalytic Reduction (SCR) with ammonia injection in conjunction with combustion modifications.

Because CEMs for organic compounds only measure carbon (as C₁), it is not possible to determine non-methane/ethane hydrocarbon concentrations on a real-time basis. As a result, a continuous emission concentration limitation as BACT for POC is not feasible. Therefore, BACT for POC is deemed to be a mass emission rate limitation to be verified by annual source testing. The POC emissions from the combustion turbine will be reduced to less than 2.0 ppmvd through the use of an oxidation catalyst. POC emissions are also minimized through the use of best combustion practices and "clean burning" natural gas.

Sulfur Dioxide (SO₂)

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT (achieved in practice) for POC for a gas turbine with a rated heat input ≥ 2.0 MW and < 50 MW as the exclusive use of clean-burning natural gas. The gas turbines will utilize natural gas exclusively to minimize SO₂ emissions. Because the emission rate of SO₂ depends on the sulfur content of the fuel burned and is not dependent upon the burner type or other combustion characteristics, the use of natural gas will result in the lowest possible emission of SO₂.

Particulate Matter (PM₁₀)

District BACT Guideline 89.1.2, dated 8/28/00, specifies BACT (achieved in practice) for POC for a gas turbine with a rated heat input ≥ 2.0 MW and < 50 MW as the exclusive use of clean-burning natural gas. The proposed turbines will utilize natural gas exclusively, which will result in minimal nitrate and sulfate particulate formation. PM₁₀ emissions are minimized through the use of best combustion practices and "clean burning" natural gas.

BACT for S-5, Fire Pump Engine & S-6, Emergency Generator Engine

The Fire Pump Engine, S-5, is a diesel, which, during an emergency can operate up to 24 hours per day. Therefore it will be subject to BACT since it can emit more than 10 lbs./day of any one pollutant. Maximum emission is 178 lbs./day of NO_x as NO₂. BACT 2 for a diesel engine is summarized in the table below:

Pollutant	BACT 2 Requirement	Proposed Engine
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		Detroit Diesel – Allison DDFP-06FA
	(gm/bhp-hr)	(gm/bhp-hr)
NO2	6.9	9.13
CO	2.75	2.16
PM10	0.15	0.12

The proposed engine does not meet the required NOx criteria and will not be permitted as it stands. The applicant is required to add NOx controls or find an engine that meets BACT.

The Emergency Generator, S-6, is natural gas fired and can operate up to 24 hours per day during an emergency. The proposed engine also triggers BACT since it can emit up to 72 lbs./day of CO. However, the proposed engine meets the required BACT 2 criteria.

Emission Offsets

Permitted Maximum Annual Emissions, tons/yr.

Pollutant	NO2	SO2	CO	POC	PM10
Facility Emissions (tpy)	75.3	5.8	95.0	20.9	43.8
Facility Threshold (tpy)	15	100	n/a	15	100
Offsets Required (tpy)	86.6	0	n/a	20.9	0

Pursuant to Regulation 2-2-302, federally enforceable emission reduction credits are required for NOx and POC increases at a ratio of 1.15 and 1.00, respectively. The applicant has demonstrated that it possesses sufficient valid POC offsets for this project, and will submit certificates before the Authority to Construct is issued. The applicant has proposed to meet the NOx offset requirement by providing POC ERC credits per 3-2-302.2. The total POC credits required would then be 107.5 tons. The applicant has provided a list of POC ERC credits, under its control, that is sufficient to satisfy the offset requirement. These ERC credits are summarized in the table below.

Current Owner	Certificate Number	Amount of POC (tpy)	Origin Location	Date Banked	Source Type

Calpine	751	53.3	Quebecor San Jose	6/99	Printing
Calpine	752	25.1	Quebecor San Jose	6/99	Printing
LSI Logic	573	15.9	LSI Milpitas	9/98	Semiconductor Fab
Owens Brockway	628	10.8	Owens Brockway Antioch	6/99	Glass Furnace
Owens Brockway	605	0.4	Owens Brockway Oakland	1/95	Glass Plant
Philips Semiconductor	287	2.6	Philips Sunnyvale	8/93	Semiconductor Fab
Philips Semiconductor	288	9.0	Philips Sunnyvale	7/93	Semiconductor Fab
Anacomp Inc.	393	7.1	Disk Systems Sunnyvale	7/94	Solvents
Total		124			

The applicant plans, however, to substitute the emission reduction credits generated by the Gilroy retrofit, provided the reductions are generated and verified in time. The District considers this approach acceptable, provided the reduction meets all the requirements. In order for the District to issue the Authority to Construct, however, the applicant must identify the ERCs, up front, to ensure that sufficient credits exist.

Prevention of Significant Deterioration, PSD

Pursuant to Regulation 2-2-304, a PSD air quality analysis is not required because this new facility emits less than the trigger levels listed below for NO₂, POC, PM₁₀, CO and SO₂. As such, the project will not be subject to PSD review for those pollutants.

Pollutant	PSD Trigger Level (tpy)	Project Emissions (tpy)
NO ₂	100	75.3
POC	n/a	20.9
PM ₁₀	100	43.8
CO	100	95.0
SO ₂	100	5.8

The sulfuric acid mist (SAM) emissions will be conditioned to be less than the PSD threshold of 7 tons per year. An enforceable permit condition has been included (Number 23) limiting sulfuric acid mist from the new combustion units to a level below the PSD

trigger level. Compliance will be determined by use of emission factors (using fuel gas rate and sulfur content as input parameters) derived from quarterly compliance source tests. The quarterly source test will be conducted, as indicated in Condition number 27, to measure SO₂, SO₃ and SAM. This approach is necessary because the extent of conversion in turbines of fuel sulfur to SO₃, and then to SAM is not well established.

Public Notice, Comment and Inspection

Because the California Energy Commission has accepted an Application for Certification for this plant, the plant is subject to the District Power Plant Regulation 2-3. Per Regulation 2-3-404, this project is subject to undergo Public Notice, Public Comment and Public Inspection requirements contained in Sections 2-2-406 and 407 of Rule 2. The APCO shall within 10 days of the notification of the applicant, cause to have published in at least one newspaper of general circulation within the District, a prominent notice stating the preliminary decision of the APCO, the location of the information available, and inviting written public comment for a 30 day period.

CEQA Analysis

Per District Regulation 2-1-310, except for permit applications which will be reviewed as ministerial projects under Section 2-1-311 or which are exempt from California Environmental Quality Act (CEQA) pursuant to Section 2-1-312, all proposed new and modified sources for which an authority to construct must be obtained from the District shall be reviewed in accordance with the requirements of CEQA. For this project, the Lead Agency under CEQA is the CEC. Pursuant to 2-1-208, the authority to Construct may not be issued until the CEC has completed its CEQA-equivalent activities; in this case, certification of the project.

B. Toxic Risk Screen

Pursuant to the BAAQMD Risk Management Policy, a health risk screening must be executed to determine the potential impact on public health resulting from the worst-case emissions of toxic air contaminants (TACs) from the project. In accordance with the requirements of the BAAQMD Risk Management Policy and California Air Pollution Control Officers Association (CAPCOA) guidelines, the impact on public health due to the emission of these compounds was assessed utilizing air pollutant dispersion models.

A review of the health risk assessment submitted by the applicant for operation of this gas turbine peaking facility was performed by the District's Toxics Evaluation Section. The emission rates are calculated based on an annual fuel use of 16,560,000 MMBtu (16,200 MMscf/yr.). The ammonia emissions shown are based upon a worst-case ammonia emission concentration of 10 ppmvd @ 15% O₂ due to ammonia slip from the SCR systems. The rest of the pollutant emissions, except for PAHs, hexane and propylene, were calculated using the emission factors from the AP42 Background Document published, by US-EPA, in April 2000. California Air Toxics Emission Factor (CATEF II) database mean emission factors, available from the California Air Resources Board (CARB) for gas

turbines with COC/SCR controls, were used for PAHs, hexane and propylene. Emissions from the cooling tower, natural gas emergency generator and diesel fire pump have been included in this risk screen.

The results of the District's risk screen are as follows:

Cancer Risk	Chronic Hazard Index	Acute Hazard Index
0.8 in a million	0.003	0.5

These levels of risk are not considered significant. Thus, in accordance with the BAAQMD Risk Management Policy, the screen passes. Therefore, the facility is deemed to be in compliance with the BAAQMD Risk Management Policy.

C. Other Applicable District Rules and Regulations

Regulation 1, Section 301: Public Nuisance

None of the project's proposed sources of air contaminants are expected to cause injury, detriment, nuisance, or annoyance to any considerable number of persons or the public with respect to any impacts resulting from the emission of air contaminants regulated by the District. In part, the air quality impact analysis is designed to insure that the proposed facility will comply with this Regulation.

Regulation 2, Rule 1, Sections 301 and 302: Authority to Construct and Permit to Operate

Pursuant to Regulation 2-1-301 and 2-1-302, the applicant has submitted an application to the District to obtain an Authority to Construct and Permit to Operate for the proposed S-1, 2, 3 and 4 Gas Turbines.

Regulation 2, Rule 2, Section 307: Certification of Compliance

Pursuant to Regulation 2-2-307, a Certification of Compliance has been received for all major facilities owned and operated by the applicant in the state of California. However, recent preliminary source tests results at a new power plant owned and operated by the applicant indicate a possibility of non-compliance at this facility. The Authority to Construct will not be issued until the compliance issues are resolved and a new Certification of Compliance has been submitted by the applicant.

Regulation 2, Rule 3: Power Plants

Pursuant to Regulation 2-3-101, this rule applies to power plants for which the California Energy Commission (CEC) has accepted a Notice of Initiation or Application for

Certification. On August 3, 2001, Calpine submitted an Application for Certification (AFC) for the Los Esteros Critical Energy Facility to the CEC. The CEC has assigned the project Docket No. 01-AFC-12.

These procedural requirements in Regulation 2, Rule 3 will be met before issuance.

Regulation 2, Rule 6: Major Facility Review

Title V of the 1990 Clean Air Act Amendments (CAAA) required states to implement and administer a source-wide operating permit program consistent with the provisions of Title 40, Code of Federal Regulations (CFR), Part 70. The BAAQMD has been delegated authority to administer the Title V program through Rule 2-6.

Pursuant to 40 CFR 72, the new units may not be operated before either the acid rain permit is issued, or 24 months after the acid rain permit application is submitted whichever is first.

Regulation 2, Rule 7: Acid Rain

Per the definition of Phase II Acid Rain Facility in Regulation 2-6-217.1, this facility is a Phase II Acid Rain Facility. This project will be subject to the requirements of Title IV of the federal Clean Air Act. The requirements of the Acid Rain Program, in 40 CFR Part 72, 73, and 75. The specifications for the type and operation of continuous emission monitors (CEMs) for pollutants that contribute to the formation of acid rain are given in 40 CFR Part 75.

District Regulation 2, Rule 7 incorporates by reference the provisions of 40 CFR Part 72 and administers the program in concert with the Title V Operating Permits Program (Rule 2-6).

The facility must obtain an Acid Rain Permit from the BAAQMD prior to the date on which the unit commences operation. The District has been delegated authority to issue Acid Rain permits.

The project will be subject to the following general requirements under the acid rain program:

- Duty to apply for a modification to the Acid Rain Permit.
- Compliance with SO₂ and NO_x emission limits.
- Duty to obtain required SO₂ allowances.
- Duty to install, operate and certify Continuous Emission Monitoring Systems (CEMs) to demonstrate compliance with the acid rain requirements.

The applicant will secure the required SO₂ allowances and will perform the required emission monitoring. Monitoring plans will be submitted as required by EPA rules.

Regulation 6: Particulate Matter and Visible Emissions

The combustion of natural gas at the proposed gas turbine is not expected to result in visible emissions. Specifically, the facility's combustion sources are expected to comply with Regulation 6, including sections 301 (Ringelmann No. 1 Limitation), 302 (Opacity Limitation) with visible emissions not to exceed 20% opacity, and 310 (Particulate Weight Limitation) with particulate matter emissions of less than 0.15 grains per dry standard cubic foot of exhaust gas volume.

Regulation 7: Odorous Substances

Regulation 7-302 prohibits the discharge of odorous substances, which remain odorous beyond the facility property line after dilution with four parts odor-free air. Regulation 7-302 limits ammonia emissions to 5000 ppm. Because the ammonia emissions from the proposed SCR system will each be limited by permit condition to 10 ppmvd @ 15% O₂, the facility is expected to comply with the requirements of Regulation 7.

Regulation 8: Organic Compounds

This facility is exempt from Regulation 8, Rule 2, "Miscellaneous Operations" per 8-2-110 since natural gas will be fired exclusively at the project.

Regulation 9: Inorganic Gaseous PollutantsRegulation 9, Rule 1, Sulfur Dioxide

This regulation establishes emission limits for sulfur dioxide from all sources and applies to the combustion sources at this facility. Section 301 (Limitations on Ground Level Concentrations) prohibits emissions which would result in ground level SO₂ concentrations in excess of 0.5 ppm continuously for 3 consecutive minutes, 0.25 ppm averaged over 60 consecutive minutes, or 0.05 ppm averaged over 24 hours. Section 302 (General Emission Limitation) prohibits SO₂ emissions in excess of 300 ppm (dry). The gas turbine is not expected to contribute to noncompliance with ground level SO₂ concentrations and should easily comply with section 302.

Regulation 9, Rule 3, Nitrogen Oxides from Heat Transfer Operations

The proposed combustion gas turbine shall comply with the Regulation 9-3-303 NO_x limit of 125 ppm with nitrogen oxide emissions of 5.0 ppmvd @ 15% O₂.

Regulation 9, Rule 8, Nitrogen Oxides and Carbon Monoxide from Stationary Internal Combustion Engines

The proposed S-5 diesel-fired fire-pump engine and the S-6 natural gas-fired generator engine are expected to comply with Regulation 9-8-330 which allows emergency use for unlimited hours, and limits non-emergency use to 100 hours per year.

Regulation 9, Rule 9, Nitrogen Oxides from Stationary Gas Turbines

Because the proposed combustion gas turbine will be limited by permit condition to NO_x emissions of 5.0 ppmvd @ 15% O₂, it will comply with the Regulation 9-9-301.3 NO_x limitation of 9 ppmvd @ 15% O₂.

Regulation 9, Rule 11, Nitrogen Oxides and Carbon Monoxide from Electric Power Generating Steam Boilers

This rule does not apply because this project does not utilize a boiler.

Regulation 10: New Source Performance Standards (NSPS)

This regulation incorporates the federal NSPS.

Subpart A General Provisions provides the general framework for NSPS. Subpart Db Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units does not apply because this project does not utilize duct burners.

Subpart GG Standards of Performance for Stationary Gas Turbines – contains NO_x and SO_x emission limits, as well as monitoring and testing requirements for combustion turbines. The project emissions will be well below the applicable NO_x and SO₂ emissions limits. The Applicant will comply with emission and fuel monitoring requirements, and monitoring plans will be submitted, as required. The applicable requirements will be incorporated into the Title V permit.

Section 112 of the Clean Air Act, National Emission Standards for Hazardous Air Pollutants (NESHAP)

These standards are contained in 40 CFR Parts 61 and 63 and are not applicable to the proposed project.

Permit Conditions

Definitions:

Clock Hour:	Any continuous 60-minute period beginning on the hour.
Calendar Day:	Any continuous 24-hour period beginning at 12:00 AM or 0000 hours.
Year:	Any consecutive twelve-month period of time
Heat Input:	All heat inputs refer to the heat input at the higher heating value (HHV) of the fuel, in Btu/scf.

Firing Hours:	Period of time, during which fuel is flowing to a unit, measured in fifteen-minute increments.
MM Btu:	million British thermal units
Gas Turbine Start-up Mode:	The time beginning with the introduction of continuous fuel flow to the Gas Turbine until the requirements listed in Condition 19 are met, but not to exceed 60 minutes.
Gas Turbine Shutdown Mode:	The time from non-compliance with any requirement listed in Condition 19 until termination of fuel flow to the Gas Turbine, but not to exceed 30 minutes.
Corrected Concentration:	The concentration of any pollutant (generally NO _x , CO or NH ₃) corrected to a standard stack gas oxygen concentration. For an emission point (exhaust of a Gas Turbine) the standard stack gas oxygen concentration is 15% O ₂ by volume on a dry basis
Commissioning Activities:	All testing, adjustment, tuning, and calibration activities recommended by the equipment manufacturers and the construction contractor to insure safe and reliable steady state operation of the gas turbines, heat recovery steam generators, steam turbine, and associated electrical delivery systems.
Commissioning Period:	The Period shall commence when all mechanical, electrical, and control systems are installed and individual system start-up has been completed, or when a gas turbine is first fired, whichever occurs first. The period shall terminate when the plant has completed performance testing, is available for commercial operation, and has initiated sales to the power exchange.
Precursor Organic Compounds (POCs):	Any compound of carbon, excluding methane, ethane, carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate

EQUIPMENT DESCRIPTION:

This Authority To Construct Is Issued And Is Valid For This Equipment Only While It Is In The Configuration Set Forth In The Following Description:

Installation of four Simple-Cycle Gas Turbine Generators Consisting Of:

1. Simple Cycle Gas Turbine, General Electric LM6000PC, Maximum Heat Input 472.6 MMBtu/hr, Maximum Electrical Output 48.7 MW, Natural Gas-Fired.
2. Selective Catalytic Reduction (SCR) NO_x Control System.
3. Ammonia Injection System.

(including the ammonia storage tank and control system)

4. Oxidation Catalyst (OC) System.
5. Continuous emission monitoring system (CEMS) designed to continuously record the measured gaseous concentrations, and calculate and continuously monitor and record the NO_x and CO concentrations in ppmvd corrected to 15% oxygen on a dry basis. The CEM shall also calculate, using District approved methods, and log any mass limits required by these conditions.

PERMIT CONDITIONS:

Conditions for the Commissioning Period

1. The owner/operator of the Los Esteros Critical Energy Facility shall minimize emissions of carbon monoxide and nitrogen oxides from S-1, S-2, S-3 and S-4 Gas Turbine to the maximum extent possible during the commissioning period. Conditions 1 through 11 shall only apply during the commissioning period as defined above.
2. At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the S-1, S-2, S-3 and S-4 Gas Turbine combustor shall be tuned to minimize the emissions of carbon monoxide and nitrogen oxides.
3. At the earliest feasible opportunity in accordance with the recommendations of the equipment manufacturers and the construction contractor, the SCR Systems (A-2, A-4, A-6 & A-8) and OC Systems (A-1, A-3, A-5 & A-7) shall be installed, adjusted, and operated to minimize the emissions of nitrogen oxides and carbon monoxide from S-1, S-2, S-3 and S-4 Gas Turbine.
4. Coincident with the steady-state operation of SCR Systems (A-2, A-4, A-6 & A-8) and OC Systems (A-1, A-3, A-5 & A-7) pursuant to condition 3 the Gas Turbine (S-1, S-2, S-3 and S-4) shall comply with the NO_x and CO emission limitations specified in conditions 19a and 19c.
5. The owner/operator of the Los Esteros Critical Energy Facility shall submit a plan to the District Permit Services Division at least two weeks prior to first firing of S-1, S-2, S-3 and S-4 Gas Turbines describing the procedures to be followed during the commissioning of the turbines. The plan shall include a description of each commissioning activity, the anticipated duration of each activity in hours, and the purpose of the activity. The activities described shall include, but not be limited to, the tuning of the water injection, the installation and operation of the required emission control systems, the installation, calibration, and testing of the CO and NO_x continuous emission monitors, and any activities requiring the firing of the Gas Turbines (S-1, S-2, S-3 and S-4) without abatement by their respective SCR Systems. The Gas Turbines

(S-1, S-2, S-3 and S-4) shall be fired no sooner than fourteen days after the District receives the commissioning plan.

6. During the commissioning period, the owner/operator of the Los Esteros Critical Energy Facility shall demonstrate compliance with conditions 8 through 10 through the use of properly operated and maintained continuous emission monitors and data recorders for the following parameters:
 - a. firing hours
 - b. fuel flow rates
 - c. stack gas nitrogen oxide emission concentrations,
 - d. stack gas carbon monoxide emission concentrations
 - e. stack gas oxygen concentrations.

The monitored parameters shall be recorded at least once every 15 minutes (excluding normal calibration periods or when the monitored source is not in operation) for the S-1, S-2, S-3 and S-4 Gas Turbines. The owner/operator shall use District-approved methods to calculate heat input rates, nitrogen dioxide mass emission rates, carbon monoxide mass emission rates, and NO_x and CO emission concentrations, summarized for each clock hour and each calendar day. All records shall be retained on site for at least 5 years from the date of entry and made available to District personnel upon request.

7. The District-approved continuous monitors specified in condition 6 shall be installed, calibrated, and operational prior to first firing of the S-1, S-2, S-3 and S-4 Gas Turbine. After first firing of the turbine, the detection range of these continuous emission monitors shall be adjusted as necessary to accurately measure the resulting range of CO and NO_x emission concentrations. The type, specifications, and location of these monitors shall be subject to District review and approval.
8. The number of firing hours of S-1, S-2, S-3 and S-4 Gas Turbines without abatement by SCR or CO Systems shall not exceed 400 hours during the commissioning period. Such operation of the S-1, S-2, S-3 and S-4 Gas Turbine without abatement shall be limited to discrete commissioning activities that can only be properly executed without the SCR or CO system in place. Upon completion of these activities, the owner/operator shall provide written notice to the District Permit Services and Enforcement Divisions and the unused balance of the 400 firing hours without abatement shall expire.
9. The total mass emissions of nitrogen oxides, carbon monoxide, precursor organic compounds, PM₁₀, and sulfur dioxide that are emitted by the S-1, S-2, S-3 and S-4 Gas Turbine during the commissioning period shall accrue towards the consecutive twelve-month emission limitations specified in condition 22.
10. The pollutant mass emissions from the S-1, S-2, S-3 and S-4 Gas Turbine shall not exceed the following limits during the commissioning period. These emission limits

shall include emissions resulting from the start-up and shutdown of the S-1, S-2, S-3 and S-4 Gas Turbine.

a. NO _x (as NO ₂)	1224 pounds per calendar day	102 pounds per hour
b. CO	1056 pounds per calendar day	88 pounds per hour
c. POC (as CH ₄)	114 pounds per calendar day	
d. PM ₁₀	240 pounds per calendar day	
e. SO ₂	32 pounds per calendar day	

11. Within sixty (60) days of startup, the Owner/Operator shall conduct a District approved source test using external continuous emission monitors to determine compliance with condition 10. The source test shall determine NO_x, CO, and POC emissions during start-up and shutdown of the gas turbines. The POC emissions shall be analyzed for methane and ethane to account for the presence of unburned natural gas. The source test shall include a minimum of three start-up and three shutdown periods. Thirty (30) days before the execution of the source tests, the Owner/Operator shall submit to the District a detailed source test plan designed to satisfy the requirements of this condition. The Owner/Operator shall be notified of any necessary modifications to the plan within 20 working days of receipt of the plan; otherwise, the plan shall be deemed approved. The Owner/Operator shall incorporate the District comments into the test plan. The Owner/Operator shall notify the District within ten (10) days prior to the planned source testing date. Source test results shall be submitted to the District within 30 days of the source testing date. These results can be used to satisfy applicable source testing requirements in Condition No. 26 below.

Conditions for Operation:

12. Consistency with Analyses: Operation of this equipment shall be conducted in accordance with all information submitted with the application (and supplements thereof) and the analyses under which this permit is issued unless otherwise noted below.
13. Conflicts Between Conditions: In the event that any condition herein is determined to be in conflict with any other condition contained herein, then, if principles of law do not provide to the contrary, the condition most protective of air quality and public health and safety shall prevail to the extent feasible.
14. Reimbursement of Costs: All reasonable expenses, as set forth in the District's rules or regulations, incurred by the District for all activities that follow the issuance of this permit, including but not limited to permit condition implementation, compliance verification and emergency response, directly and necessarily related to enforcement of the permit shall be reimbursed by the owner/operator as required by the District's rules or regulations.
15. Access to Records and Facilities: As to any condition that requires for its effective enforcement the inspection of records or facilities by representatives of the District, the

Air Resources Board (ARB), the U.S. Environmental Protection Agency (U.S. EPA), or the California Energy Commission (CEC), the owner/operator shall make such records available or provide access to such facilities upon notice from representatives of the District, ARB, U.S. EPA, or CEC. Access shall mean access consistent with California Health and Safety Code Section 41510 and Clean Air Act Section 114A.

16. Notification of Commencement of Operation: The owner/operator shall notify the District of the date of anticipated commencement of turbine operation not less than 10 days prior to such date. Temporary operations under this permit are granted consistent with the District's rules and regulations.
17. Operations: The gas turbine, emissions controls, CEMS and associated equipment shall be properly maintained and kept in good operating condition at all times when the equipment is in operation.
18. Visible Emissions: No air contaminant shall be discharged into the atmosphere for a period or periods aggregating more than three minutes in any one hour which is as dark or darker than Ringelmann 1 or equivalent 20% opacity.
19. Emissions Limits:
 - a. Oxides of nitrogen (NO_x) emissions from the gas turbine shall not exceed 5.0 ppmvd @ 15% O₂ (3-hour rolling average), except during periods of startup and shutdown as defined in this permit. The NO_x emission concentration shall be verified by a District-approved continuous emission monitoring system (CEMS) and during any required source test. (basis: BACT)
 - b. Ammonia emissions from the gas turbine shall not exceed 10 ppmvd @ 15% O₂ (1-hour rolling average), except during periods of startup and shutdown as defined in this permit. The ammonia emission concentration shall be verified by the continuous recording of the ratio of the ammonia injection rate to the NO_x inlet rate into the SCR control system (molar ratio). The maximum allowable NH₃/NO_x molar ratio shall be determined during any required source test, and shall not be exceeded until reestablished through another valid source test. (basis: BACT)
 - c. Carbon monoxide (CO) emissions from the gas turbine shall not exceed 6 ppmvd @ 15 % O₂ (1-hour rolling average), except during periods of startup and shutdown as defined in this permit. The CO emission concentration shall be verified by a District-approved CEMS and during any required source test. (basis: BACT)
 - d. Precursor organic compound (POC) emissions from the gas turbine shall not exceed 2 ppmvd @ 15% O₂ (1-hour rolling average), except during periods of startup and shutdown as defined in this permit. The POC emission concentration shall be verified during any required source test. (basis: BACT)

- e. Particulate matter emissions less than ten microns in diameter (PM10) from the gas turbine shall not exceed 2.5 pounds per hour, except during periods of startup and shutdown as defined in this permit. The PM10 mass emission rate shall be verified during any required source test. (basis: BACT & cumulative increase)
 - f. Oxides of sulfur emissions (SOx) from the gas turbine shall not exceed 0.33 pounds per hour, except during periods of startup and shutdown as defined in this permit. The SOx emission rate shall be verified during any required source test. (basis: BACT & cumulative increase)
20. Turbine Startup: Startup of the gas turbine shall not exceed a time period of 60 minutes each per occurrence, or another time period based on good engineering practice and approved in advance by the District. The startup clock begins with the turbine's initial firing and continues until the unit meets the emission concentration limits. (Basis: Cumulative increase)
21. Turbine Shutdown: Shutdown of the gas turbine shall not exceed a time period of 30 minutes each per occurrence, or another time period based on good engineering practice and approved in advance by the District. Shutdown begins with initiation of the turbine shutdown sequence and ends with the cessation of turbine firing. (Basis: Cumulative increase)
22. Mass Emission Limits: Total mass emissions from the S-1, S-2, S-3 and S-4 Gas Turbine shall not exceed the daily, and annual mass emission limits listed in Table 1 below.

Table 1 – Mass Emission Limits (Including Startups and Shutdowns)

Pollutant	Daily (lb.)	Annual (tons)
NOx (as NO ₂)	821	74.9
POC	113	20.8
CO	599	94.6
SOx (as SO ₂)	32	5.8
PM10	240	43.8
NH3	607	110.7

The daily and annual mass limits are on a calendar basis. Compliance shall be based on calendar average one-hour readings through the use of process monitors (e.g., fuel use meters), CEMS, and source test results; and the monitoring, recordkeeping and reporting conditions of this permit. (Basis: Cumulative increase & record keeping)

23. Acid Limit: The sulfuric acid emissions (SAM) from S-1 through S-4 combined shall not exceed 7 tons in any consecutive four quarters. (Basis: PSD)

24. Operational Limits: In order to comply with the emission limits of this rule, the owner/operator shall comply with the following operational limits:

- a. The heat input to any gas turbine shall not exceed:

Hourly: 472.6 MMBtu/hr

Daily: 11,342 MMBtu/day

Four Turbines

Annual: 16,560,000 MMBtu/year

- b. Only PUC Quality natural gas (General Order 58-a) shall be used to fire the gas turbine. The natural gas shall not contain total sulfur in concentrations exceeding 0.25 gr./100 scf.
- c. The owner/operator of the gas turbine shall comply with the daily and annual emission limits listed in Table 1 by keeping running totals based on CEM data. (Basis: Cumulative increase)

25. Monitoring Requirements: The owner/operator shall comply with the following monitoring requirements for each gas turbine:

- a. The gas turbine exhaust stack shall be equipped with permanent provisions to allow collection of stack gas samples consistent with EPA test methods.
- b. The ammonia injection system shall be equipped with an operational ammonia flowmeter and injection pressure indicator accurate to plus or minus five percent at full scale and calibrated once every twelve months.
- c. The gas turbine exhaust shall be equipped with continuously recording emissions monitor(s) for NO_x, CO and O₂. Continuous emissions monitors shall comply with the requirements of 40 CFR Part 60, Appendices B and F, and 40 CFR Part 75, and shall be capable of monitoring concentrations and mass emissions during normal operating conditions and during startups and shutdowns.
- d. The fuel heat input rate shall be continuously recorded using District-approved fuel flow meters along with quarterly fuel compositional analyses for the fuel's higher heating value (wet basis).
- e. The total sulfur content of the fuel gas shall be analyzed on a quarterly basis. (Basis: Monitoring & record keeping)

26. Source Testing/RATA: Within sixty days after startup of the gas turbines, and at a minimum on an annual basis thereafter, a relative accuracy test audit (RATA) must be performed on the CEMS in accordance with 40 CFR Part 60 Appendix B Performance

Specifications and a source test shall be performed. Additional source testing may be required at the discretion of the District to address or ascertain compliance with the requirements of this permit. The written test results of the source tests shall be provided to the District within thirty days after testing. A complete test protocol shall be submitted to the District no later than 30 days prior to testing, and notification to the District at least ten days prior to the actual date of testing shall be provided so that a District observer may be present. The source test protocol shall comply with the following: measurements of NO_x, CO, POC, and stack gas oxygen content shall be conducted in accordance with ARB Test Method 100; measurements of PM₁₀ shall be conducted in accordance with ARB Test Method 5; and measurements of ammonia shall be conducted in accordance with Bay Area Air Quality Management District test method ST-1B. Alternative test methods, and source testing scope, may also be used to address the source testing requirements of the permit if approved in advance by the District. The initial and annual source tests shall include those parameters specified in the approved test protocol, and shall at a minimum include the following:

- a. NO_x– ppmvd at 15% O₂ and LB/MMBtu (as NO₂);
 - b. Ammonia – ppmvd at 15% O₂ (Exhaust);
 - c. CO – ppmvd at 15% O₂ and LB/MMBtu (Exhaust);
 - d. POC – ppmvd at 15% O₂ and LB/MMBtu (Exhaust);
 - e. PM₁₀ – LB/hr (Exhaust);
 - f. SO_x – LB/hr (Exhaust);
 - g. Natural gas consumption, fuel High Heating Value (HHV), and total fuel sulfur content;
 - h. Turbine load in megawatts;
 - i. Stack gas flow rate (SDCFM) calculated according to procedures in U.S. EPA Method 19.
 - j. Exhaust gas temperature (°F)
 - k. Ammonia injection rate (LB/hr or moles/hr)
(Basis: source test requirements & monitoring)
27. Within 60 days of start-up of the LECEF and on a semi-annual basis thereafter, the owner/operator shall conduct a District approved source test on exhaust points for S-1 through S-4 while each Gas Turbine is operating at maximum load to demonstrate compliance with the SAM levels in Condition number 23. The owner/operator shall test for (as a minimum) SO₂, SO₃ and SAM. After acquiring one year of source test data on these units, the owner/operator may petition the District to switch to annual source testing if test variability is low. (Basis: PSD Avoidance, SAM Periodic Monitoring)
28. A written quality assurance program must be established in accordance with 40 CFR Part 75, Appendix B and 40 CFR Part 60 Appendix F. (Basis: continuous emission monitoring)
29. The owner/operator shall comply with the applicable requirements of 40 CFR Part 60 Subpart GG. (Basis: NSPS)

30. The owner/operator shall notify the District of any breakdown condition consistent with the District's breakdown regulations. (Basis: Regulation 1-208)
31. The District shall be notified in writing in a timeframe consistent with the District's breakdown regulations following the correction of any breakdown condition. The breakdown condition shall include a description of the equipment malfunction or failure, the date and cause of the initial failure, the estimated emissions in excess of those allowed, and the actions taken to restore normal operations. (Basis: Regulation 1-208)
32. Recordkeeping: The owner/operator shall maintain the following records:
- a. hourly, daily, quarterly and annual quantity of fuel used and corresponding heat input rates;
 - b. the date and time of each occurrence, duration, and type of any startup, shutdown, or malfunction along with the resulting mass emissions during such time period;
 - c. emission measurements from all source testing, RATAs and fuel analyses;
 - d. daily, quarterly and annual hours of operation;
 - e. hourly records of NO_x and CO, emission concentrations and hourly ammonia injection rates and ammonia/NO_x ratio.
 - f. for the continuous emissions monitoring system; performance testing, evaluations, calibrations, checks, maintenance, adjustments, and any period of non-operation of any continuous emissions monitor.
- (Basis: record keeping)
33. All records required to be maintained by this permit shall be retained by the permittee for a period of five years and shall be made readily available for District inspection upon request. (Basis: record keeping)
34. Reporting: The owner/operator shall submit to the District a written report for each calendar quarter, within 30 days of the end of the quarter, which shall include:
- a. Daily and quarterly fuel use and corresponding heat input rates;
 - b. Daily and quarterly mass emission rates for all criteria pollutants during normal operations and during other periods (startup/shutdown, breakdowns);
 - c. Time intervals, date, and magnitude of excess emissions;
 - d. Nature and cause of the excess emission, and corrective actions taken;
 - e. Time and date of each period during which the CEM was inoperative, except for zero and span checks, and the nature of system repairs and adjustments;
 - f. A negative declaration when no excess emissions occurred;
 - g. Results of quarterly fuel analyses for HHV and total sulfur content.
- (Basis: record keeping & reporting)

35. Emission Offsets: The owner/operator shall offset the project emissions in the amount and at the ratios outlined in Table 2 below.

Table 2 – Emission Offsets

Pollutant	Emissions Requiring Offsets (tons/yr.)	Offset Ratio	Total ERCs Required (tons/yr.)
NO _x (as NO ₂)	75.4	1.15	86.7
POC	20.9	1.00	20.9

The ERC certificates must be delivered to the District ten days prior to the issuance of the ATC. (Basis: Emission Offsets)

36. District Operating Permit: The owner/operator shall apply for and obtain all required operating permits from the District according to the requirements of the District's rules and regulations. (Basis: Regulations 2-2 & 2-6)
37. Title IV and Title V Permits: The applications for modification of the Title IV and Title V permits must be delivered to the District prior to first-fire of the turbines. Also the acid rain monitors (Title IV) must be certified within 90 days of first-fire. (Basis: Regulation 2-6)
38. Final S-5 Fire Pump Engine selection or modification to meet BACT requirements, shall be submitted to the District prior to the Authority to Construct issuance. (BACT)
39. The S-5 Fire Pump Engine shall be fired exclusively on diesel fuel having a sulfur content no greater than 0.05% by weight. (Toxics, Cumulative Increase)
40. The S-5 Fire Pump Engine shall be operated for no more than 1 hour per day and 100 hours per year for the purpose of reliability testing and non-emergency operation. (BACT)
41. The S-5 Fire Pump Engine shall be equipped with a non-resettable totalizing counter that records hours of operation. (BACT)
42. The following monthly records shall be maintained in a District-approved log for at least 5 years and shall be made available to the District upon request: (BACT)
- a. Total number of hours of operation for S-5.
 - b. Fuel usage at S-5

43. The S-6 Emergency Generator shall be fired exclusively on natural gas. (Toxics, Cumulative Increase).
44. The S-6 Emergency Generator shall be operated for no more than 2 hours per day and 100 hours per year for the purpose of reliability testing or in anticipation of imminent emergency conditions. Emergency conditions are: (1) Failure of a regular power supply, or (2) involuntary curtailment of a power supply (where the utility that provides regular power has been instructed by the ISO to shed firm load, or where the utility has actually shed firm load). (BACT, Cumulative Increase)
45. The S-6 Emergency Generator shall be equipped with a non-resettable totalizing counter that records hours of operation. (BACT)
46. The following monthly records shall be maintained in a District-approved log for at least 5 years and shall be made available to the District upon request: (BACT)
 - a. Total number of hours of operation for S-6
 - b. Fuel usage at S-6

Conclusion

The proposed Los Esteros Critical Energy Project, which is composed of the permitted sources listed below, complies with all applicable District rules and regulations except for the Certification of Compliance, 2-2-307 and BACT for the Fire Pump Engine, 2-2-302. We recommend that the District issue a Preliminary Determination of Compliance document for this project. Provided the above shortcomings are resolved, we further recommend that upon completion of the public comment period and evaluation of any comments received the District issue a Final Determination of Compliance for the following equipment:

- S-1 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 48.7 MW max, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-1 Oxidation Catalyst, and A-2 Selective Catalytic Reduction System.**
- S-2 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 48.7 MW max, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-3 Oxidation Catalyst, and A-4 Selective Catalytic Reduction System.**
- S-3 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 48.7 MW max, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-5 Oxidation Catalyst, and A-6 Selective Catalytic Reduction System.**

- S-4 Combustion Gas Turbine with Water Injection, General Electric LM6000PC Sprint, natural gas fired, 48.7 MW max, net simple-cycle, 472.6 MMBtu/hr maximum heat input rating; abated by A-7 Oxidation Catalyst, and A-8 Selective Catalytic Reduction System.**
- S-5 Fire Pump Engine, Sterling DDFP-06FA, diesel fired, 368 HP, 2.8 MMBtu/hr maximum heat input rating, with NOx controls or equivalent.**
- S-6 Emergency Generator Engine, Caterpillar G3512 90 LE or equivalent, natural gas-fired, 804 HP (600 kW), 6.44 MMBtu/hr maximum heat input rating.**

Pursuant to District Regulation 2-3-404, this document shall be subject to the public notice, public comment, and public inspection requirements of Regulation 2-2-406 and 2-2-407.

Written comments on this Preliminary Determination of Compliance should be directed to:

Ellen Garvey
Air Pollution Control Officer/Executive Officer
Bay Area Air Quality Management District
939 Ellis Street
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